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Results of the 1986 Rockfish Harvest Log Program

C. M. Hand and L. J. Richards

Department of Fisheries and Oceans
Biological Sciences Branch
Pacific Biological Station
Nanaimo, British Columbia V9R 5K6

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Department of Fisheries and Oceans
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Nanaimo, British Columbia V9R 5K6

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ABSTRACT

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In 1986, a rockfish harvest log program was initiated to satisfy the need for more precise information on the inshore commercial rockfish fishery. This report documents the results of the first year of the program. Of the 998 licensed handline/troll and longline vessels from which rockfish landings were reported, harvest logs only were submitted from 92, sales slips only were submitted from 661, and both were submitted from 245. Reported catch was lower for harvest logs than for sales slips for most statistical areas. The apparent reporting rate for rockfish catch on harvest logs was higher for the east coast of Vancouver Island than for the north coast and the west coast of Vancouver Island (73% vs 22% and 30%, respectively). The reporting rate was higher for handline gear than longline gear (62% vs 34%). Harvest logs identified 101 t (6%) of the total landings as unreported catch. The rockfish catch incidental to other fisheries was 2% of the total catch. Species composition varied with fishing gear and geographical area. The catch from longline gear was predominantly yelloweye rockfish, while the handline/troll catch was dominated by quillback and copper rockfish for the east coast of Vancouver Island. The within-area variability of harvest log CPUE was greater than sales slip CPUE in 67% of the statistical areas. Mean CPUE varied inconsistently among statistical areas between harvest logs and sales slips.

RÉSUMÉ

Hand, C. M. and L. J. Richards. 1988. Results of the 1986 rockfish harvest log program. Can. MS Rep. Fish. Aquat. Sci. 1986: 23 p.

En 1986, on a lancé un programme de registres de pêche des scorpènes pour répondre au besoin d'avoir des informations plus précises concernant la pêche commerciale des scorpènes pris des côtes. Le présent rapport fournit les résultats de la première année du programme. Des 998 palangriers et bateaux de pêche aux lignes à main/traînantes munis d'un permis qui ont signalé des débarquements de scorpènes, 92 ont soumis seulement des registres de pêche, 661 n'ont soumis que des fiches de vente et 245 ont soumis les deux. Pour la plupart des secteurs statistiques, les prises signalées ont été plus faibles dans les registres de pêche que dans les fiches de vente. Le taux apparent de transmission de rapports pour les prises de scorpènes figurant dans les registres de pêche a été plus élevé pour la côte est de l'île Vancouver que pour la côte nord et la côte ouest de l'île (73% par rapport à 22 et 30% respectivement). Le taux de transmission de rapports a été plus élevé pour la pêche avec lignes à main que pour celle avec palangres (62% par rapport à 34%). Les registres de pêche ont permis de déterminer que 101 t (6%) de total des débarquements étaient des prises non signalées. Les prises accessoires de scorpènes dans d'autres pêches représentaient 2% du total des prises. La composition des espèces variait suivant l'engin de pêche et la région. Les prises effectuées au moyen de palangres étaient constituées principalement de sébaste aux yeux jaunes, alors que celles réalisées au moyen de lignes à main/traînantes étaient surtout représentées par le sébaste à dos épineux et le sébaste cuivré sur la côte est de l'île Vancouver. Dans 67% des secteurs statistiques, la variabilité à l'intérieur des secteurs des PPUE figurant sur les registres de pêche était plus grande que celle des PPUE indiquées sur les fiches de vente. Les PPUE moyennes ont varié de façon inégale d'un secteur statistique à l'autre entre les registres de pêche et les fiches de vente.

INTRODUCTION

Nominal catch in the handline/troll and longline rockfish fishery in the Strait of Georgia fluctuated around 75 t between 1954 (the first year for which catch data became available) and 1976. Since 1976, catch has increased progressively to the 1986 high of 475 t (Richards 1988). Handline/troll and longline rockfish catch in other areas of British Columbia has followed a similar trend; the catch fluctuated around 90 t until 1976 and then increased to 890 t by 1986. The increase is largely due to the high prices paid for live rockfish.

The first stock assessment for rockfish in the Strait of Georgia was completed in 1986 (Richards 1986a), and stock assessments are now conducted annually. The main source for information on rockfish catch and effort is the sales slip database, maintained by the Fisheries Branch of the Department of Fisheries and Oceans. The data base contains information from sales slips on statistical area fished (Fig. 1), number of days fished, gear used, and the total weight of catch by market category. It does not contain a breakdown of the rockfish catch by species. Further, fishing effort based on sales slips is difficult to interpret without additional information.

Inshore rockfish fishing by handline/troll or longline gear is now scheduled under a Z licence. The change in licensing from 'C' to 'Z' was implemented in 1986, in response to an increasing number of vessels participating in the fishery. A condition of the rockfish Z licence is that harvest logs be submitted from each vessel. The harvest logs are designed to supplement the sales slip data base with detailed information on the rockfish fishery, including catch, fishing effort, species composition, location and depth fished and fishing gear. This report presents an analysis of the first year of the harvest log program. The analysis includes rockfish catch by statistical area, rockfish species composition, and catch per unit effort (CPUE). Where possible, we compare the harvest log and sales slip data bases.

METHODS

The harvest logs are designed to be as simple as possible (Fig. 2). The top line of the log is used to identify the skipper, fishing vessel, CFV number and fishing method. The remainder of the log is composed of a series of columns to record date fished, statistical area, location of fishing, depth fished, hours fished, the number of fish kept, and additional remarks. The most common species caught in the inshore rockfish fishery are quillback rockfish (Sebastes maliger), copper rockfish (S. caurinus), yelloweye rockfish (S. ruberrimus) and lingcod (Ophiodon elongatus). There are labelled columns for these species, as well as a column to identify the number of other species caught. Fishermen complete one line of the log for each day fished.

When harvest logs are returned by fishermen, the information is first transferred to coding forms. Information from each day fished is coded as a separate record. The forms are then keypunched, and the data are transferred to files maintained on a VAX 11/785 computer at the Pacific Biological Station. An attempt is made to code all details provided by fishermen. For example, the total weight of the catch may be listed, or a note may be made that the rockfish were caught while fishing for salmon or halibut. As catch is often listed in pounds or as a percentage, catch units are recorded for each entry.

Incomplete harvest logs are frequently returned, and a series of error codes are used to describe missing information. One error code denotes records that are missing minor details such as depth and/or statistical area fished. Another error code is used to flag records that cannot be used for subsequent CPUE analysis. These include records that are missing the date or hours fished, records where fishing effort is summed over a number of days, or where effort is roughly estimated. A third error code is used to identify records that cannot be used to determine total catch. These include records where the catch units (weight or numbers) are ambiguous, catch is given as a total weight over all species, or total catch is estimated.

As a first step in analysis of the harvest log data, catch in numbers is converted to catch in weight (kg). Conversion rates are based on the mean weight of biological samples from the commercial fishery, and are derived from several sources. Different conversion rates are used for different areas, where fish size is known to differ. The conversion rates (kg) by species and statistical area are as follows:

Species	Area	Weight (kg)	Source
Quillback Rockfish	1-29	0.78	Cass et al. 1986
Copper Rockfish	1-29	0.62	Cass et al. 1986
Yelloweye Rockfish	1-10	4.2	PBS data files
Yelloweye Rockfish	11-19	2.2	PBS data files
Yelloweye Rockfish	20-27	3.5	PBS data files
Unknown Rockfish	1-29	0.78	Cass et al. 1986
Lingcod	1-29	3.1	Hand and Richards 1987

Sales slip CPUE is qualified as described in Richards (1988). By this method, sales slip records with a rockfish catch of 50 kg or greater are included in the analysis. Sales slip CPUE is expressed in kg/d. Hours of fishing are not recorded for sales slips, and so kg/d is used as the common unit to compare sales slips and harvest logs. For the harvest logs, each record is assumed to represent one day of fishing.

RESULTS

VESSEL CATCH/FLEET CHARACTERISTICS

A total of 1,101 rockfish licences were issued in 1986 for handline/troll or longline gear. Vessels that are licensed to fish for rockfish are identified in the sales slip and harvest log data bases by CFV number. A catch of at least 20 kg was reported by 91% of the licensed vessels on either sales slips or harvest logs. A catch of less than 20 kg was reported by another 2%. Both harvest logs and sales slips were submitted from only 24% of the vessels that reported a catch of at least 20 kg. An unknown amount of rockfish may have been caught but not reported on either harvest logs or sales slips.

Catches by handline/troll gear were reported from 638 vessels on sales slips and/or harvest logs. Of these, 64% submitted sales slips only, 19% submitted harvest logs only, and both were submitted from 26%. Catches reported on harvest logs but not sales slips amounted to 68 t of rockfish. This is 11% of the total 'best estimate' handline/troll catch (sales slip catch plus the reported catch from the 63 vessels that did not submit sales slips).

Catches by longline gear were reported from 360 vessels on either sales slips or harvest logs. Of these, 70% submitted sales slips only, 8% submitted harvest logs only and both were submitted by 22%. Catches reported on harvest logs but not sales slips amounted to 33 t of rockfish, or 4% of the 'best estimate' longline catch.

Handline vessels fishing in the north coast and west coast of Vancouver Island are larger on average than those fishing inside waters (11.8 m vs 8.9 m) (Table 1). The average length of the 47 handline vessels that fished in area 12 was 9.8 m ($\pm$ 2.6 m) as compared to 8.1 m ($\pm$ 2.7 m) for the 70 boats that fished in area 13.

There is no relationship between vessel length and either the average hours fished per day, the total yearly catch of rockfish or CPUE (kg/d or kg/h). There is a relationship between vessel length and total annual effort in that small vessels tend to fish more days than larger ones (Fig 3). This may be because smaller vessels are less equipped to participate in other fisheries.

ROCKFISH CATCH

There is very little agreement between catches by statistical area as reported on harvest logs and sales slips, even in relative amounts (Table 2). In general, higher catches are reported on sales slips, especially for longline gear. The difference cannot be accounted for by elimination of

harvest log records due to error codes, as less than 1% of the harvest log records were rejected for the catch calculations.

For the eastern south coast, agreement between harvest logs and sales slips is greatest for statistical areas 13 and 16 to 18. For the western south coast, there is little agreement for either gear type. For the north coast, the agreement is good for handline/troll gear, but poor for longline gear, especially for statistical areas 1 to 3. The discrepancy may be due, in part, to differences in the area recorded for a given catch.

If catches from individual vessels are compared between harvest logs and sales slips, 20% of the harvest log catch by handline/troll (68.4 t) and 10% of the harvest log catch by longline (33.0 t) is not accounted for by sales slips. Addition of these catches would increase the total handline/troll catch to 626 t and the total longline catch to 955 t for a total 1986 catch of 1,581 t (Table 3). Harvest logs, then, uniquely identify 6% of the total catch.

The rockfish catch reported on harvest logs as incidental to other fisheries is only 2% of the total 1986 catch. Most of the incidental catch occurs in the dogfish fishery--7.5 t of rockfish from the inside waters of Vancouver Island and 1.3 t from statistical area 25. The rockfish catch incidental to the salmon fishery totals 3.7 t and to the halibut fishery totals 0.7 t. These are conservative estimates as "target species" was rarely given on the harvest logs. It is also likely that fewer harvest logs are submitted for an incidental catch.

SPECIES COMPOSITION

Quillback, copper and yelloweye rockfish are the most important species in the catch. Other common species in the catch include tiger rockfish (Sebastes nigrocinctus), black rockfish (S. melanops), yellowtail rockfish (S. flavidus), bocaccio (S. paucispinis), china rockfish (S. nebulosus) and canary rockfish (S. pinniger). The coastwide catch of these species totals 41 t.

Quillback and copper rockfish are predominant in all statistical areas in inside waters for the handline/troll fishery and in areas 12 and 17 to 19 for the longline fishery (Fig. 4). The ratio of quillback to copper rockfish in the handline/troll catch is approximately 85:15 for all areas. Catches from the longline fleet average 70% quillback for the north coast, 85% quillback for the Strait of Georgia and 75% quillback off the west coast of Vancouver Island.

Catches off the west coast of Vancouver Island are predominantly yelloweye rockfish (85% by weight) for both gear types (Fig. 4). Yelloweye rockfish are more abundant in deeper water (Richards 1986b). The high catch of yelloweye rockfish on the west coast of Vancouver Island, relative to the east coast, cannot be explained by depth fished, however. The percentage of time spent fishing at a given depth is similar between the two regions

(Table 4). The percentage by weight of yelloweye rockfish in the total catch would appear higher than if expressed in numbers because of their higher average weight compared to quillback and copper rockfish.

The proportion of yelloweye rockfish to other rockfish compares reasonably well between sales slips and harvest logs for handline/troll gear. There is less agreement between the two sources for longline gear. Where there are discrepancies, the sales slip catch tends to have a lower proportion of yelloweye rockfish.

CPUE

Mean CPUE is calculated in kg/h and kg/d by statistical area for handline/troll gear from harvest log records, excluding records that are rejected due to errors. CPUE is not examined for longline gear because of the difficulty in interpreting soaktime without additional information. CPUE calculations are based on the quillback and copper rockfish catch only. Yelloweye rockfish are excluded due to their larger mean size. Inclusion of the yelloweye rockfish catch could strongly bias mean CPUE, and the proportion of yelloweye in the total catch varies by area (Fig. 4).

We examined several techniques to standardize CPUE. Qualifying the data by imposing a minimum number of days fished per year of 5, 10 and 20 days does not result in any large or consistent effects on CPUE; evidently, vessels that fish only a few days are as efficient as the more devoted fishermen. Similarly, elimination of records from vessels that have fewer than 100, 250 and 500 kg of total annual catch has little effect in most cases. Qualifying the data by a minimum daily landing of 20 and 50 kg results in progressively higher values of mean CPUE and, generally, lower variances. A minimum daily catch of 20 kg was finally selected, as this method is consistent with the method used for sales slips. The 20 kg/d threshold is comparable to the 50 kg catch used for sales slips because sales slips records usually represent combined catches over several days.

After the qualification method was applied, the distributions of harvest log and sales slip CPUE were examined and found to be skewed. Power transformations have been used to normalize CPUE data in other contexts (Quinn 1985, Richards 1987). A square-root transformation was effective in approximating normality for harvest log CPUE. Sales slip CPUE was more highly skewed than harvest log CPUE, and a logarithmic transformation was applied to it. The resulting distributions are similar for the two data bases for statistical areas with large sample sizes (Fig. 5).

Sales slip CPUE for any given statistical area tends to be less variable than harvest log CPUE (Table 5). This may reflect the different ways in which effort for the two data bases is recorded. Each sales slip record is a total of the catch and effort over an average of 4.3 days, while harvest log records are single-day totals. Hence, the variance in harvest log CPUE may be more representative of the true day-to-day variability.

DISCUSSION

This paper describes the analysis for the first year of the harvest log program. However, the conclusions that can be made regarding the usefulness of the program are still somewhat limited. Several years of data are necessary so that a time series trend of CPUE from harvest logs can be compared with CPUE trends from sales slips, and with other indicators of stock abundance.

Catch reported on harvest logs compares very poorly with sales slips; only 55% of the 'best estimate' handline/troll catch and 32% of the 'best-estimate' longline catch was reported on harvest logs. This discrepancy is too large to be explained by recording inaccuracies of harvest log records. It probably reflects the problem in initiating a new program. Not all fishermen were aware of the regulation to submit harvest logs. Hopefully, there will be an increased response to the harvest log program in 1987.

Based on the 1986 harvest log program, at least 6% of the inshore rockfish catch in British Columbia is not reported by sales slips. This estimate was obtained by comparing vessel catches between the two data bases; any catch from vessels that submitted harvest logs but not sales slips was considered as unreported catch. This figure is conservative because catch not registered by either source is entirely undetected. Discrepancies between harvest log and sales slip catches for a particular vessel were not examined because the catch from several vessels may be combined prior to a sale. Harvest logs were submitted from only 36% of the handline vessels and 30% of the longline vessels. Therefore, unreported catch could be as high as 25% to 30% of the total 'best estimate' catch.

The ratio of quillback to copper rockfish from the harvest logs agrees closely with biological samples taken from the commercial fishery between 1984-86 (Cass et al. 1986). There is a large difference in the ratio of yelloweye to other rockfish between harvest logs and sales slips, particularly with longline gear. The proportion of yelloweye in the catch from sales slips is lower than that from harvest logs. Generally, the absolute yelloweye rockfish catch from the sales slips is less than the catch reported on harvest logs, while for other rockfish, the reported catch is greater on the sales slips. It is likely that yelloweye rockfish are misidentified on both harvest logs and sales slips because there is no check on species identification.

Although the harvest log program is labor intensive, it does provide valuable information on many aspects of the commercial rockfish fishery. Through the harvest logs, at least 100 t of unreported catch was identified in 1986. The species breakdown from harvest logs is more detailed for the inshore species of rockfish than from the sales slips. In many cases, fishing locations are provided, making a more refined analysis of the effects of fishing on local rockfish stocks possible. Finally, the harvest logs are frequently used by fishermen as a vehicle to express their observations and opinions.

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Table 1. Length (m) and standard deviation of handline/troll vessels by statistical area.

Area	Mean Length (m)	+- STD	N
North Coast	11.8	2.3	30
4	11.6	0.8	4
5	11.8	3.2	3
6	13.0	1.5	7
7	11.6	2.5	7
9	10.3	0.4	2
11	12.4	1.3	4
E Coast Van. Is.	8.8	2.9	132
12	9.8	2.6	47
13	8.1	2.7	70
14	11.6	1.0	4
15	9.9	-	1
16	10.0	2.5	6
17	8.3	3.9	13
18	8.4	2.9	14
19	5.5	0.8	8
W Coast Van. Is.	11.8	2.2	39
23	10.8	2.4	5
24	12.0	1.7	10
25	12.5	2.7	6
26	11.4	2.1	7
27	12.2	2.4	11

Table 2. Rockfish catch (kg) in 1986 by statistical area and gear type from the sales slip data set. The percentage of the sales slip catch reported on harvest logs is given in parentheses.

Area	Handline/Troll		Longline		Combined	
North Coast	46,795	(89)	313,108	(14)	359,903	(22)
1	3,438	(170)	24,950	(6)	28,388	(26)
2	4,565	(110)	159,979	(4)	165,544	(7)
3	250	(164)	3,773	(7)	3,988	(17)
4	7,028	(61)	9,660	(98)	16,688	(82)
5	4,352	(99)	14,505	(41)	18,857	(54)
6	7,299	(118)	18,235	(59)	25,534	(76)
7	7,470	(45)	5,123	(78)	12,593	(58)
8	1,410	(157)	19,706	(24)	21,116	(33)
9	525	(310)	939	(0)	1,464	(111)
10	1,278	(75)	315	(111)	1,593	(82)
11	9,180	(56)	55,923	(44)	65,103	(46)
E Coast Van. Is.	355,999	(73)	161,428	(72)	517,427	(73)
12	103,986	(55)	31,287	(20)	135,273	(47)
13	134,743	(104)	7,946	(80)	142,689	(102)
14	3,667	(14)	14,725	(51)	18,392	(43)
15	12,480	(8)	12,418	(69)	24,898	(39)
16	9,280	(71)	49,380	(88)	58,660	(85)
17	25,274	(69)	37,742	(95)	63,016	(85)
18	39,401	(75)	6,383	(79)	45,784	(76)
19	22,113	(41)	1,547	(32)	23,660	(40)
28	5,055	(0)	--		5,055	(5)
W Coast Van. Is.	154,911	(27)	445,526	(28)	600,437	(30)
20	4,749	(152)	4,513	(2)	9,262	(79)
21	2,265	(40)	1,941	(0)	4,206	(21)
23	31,260	(11)	36,329	(8)	67,589	(9)
24	50,780	(10)	56,919	(22)	107,699	(17)
25	9,603	(79)	75,659	(64)	85,262	(65)
26	10,604	(87)	76,777	(8)	87,381	(18)
27	45,650	(14)	116,319	(47)	161,969	(38)
30	--		79,010	(3)	79,010	(4)
Coastwide	557,705	(62)	920,062	(34)	1,477,767	(44)

Table 3. Rockfish catch (kg) in 1986 by major area and gear type, based on sales slip data and including unreported catch from harvest log data.

Major Area	Gear	
	Handline/troll	Longline
North Coast (5C, 5D & 5E)	37,114	243,383
Central Coast (5A & 5B)	26,239	86,077
E Coast Van. Is. (4B)	399,044	180,982
W Coast Van. Is. (3C & 3D)	163,418	443,812
Unknown area	-	5,916
Total	625,815	960,170

Table 4. Percentage of time fishing by depth and statistical area for handline/troll and longline gear types.

Area	Depth[a]						Total Hours
	1	2	3	4	5	6	
11		27	16	43	11	3	766
12		16	43	27	7	7	5,756
13	1	29	27	31	8	4	14,241
14		3	3	80	13	1	357
15			51	49			140
16		24	23	24	12	17	783
17	6	23	34	18	9	11	1,993
18	3	18	52	15	1	11	3,167
19		28	36	35		1	577
23	20	39	23	18			210
24			78	7	16		609
25		59	29	4	7		190
26		6	62	16	1	15	659
27	4	6	12	68	10	1	356

[a]Depth: 1 < 10 fath
2 = 10-19 fath
3 = 20-29 fath
4 = 30-39 fath
5 = 40-49 fath
6 > 50 fath

Table 5. Mean rockfish[a] CPUE[b] (kg/h), one standard deviation and number of records for harvest logs by statistical area, and mean CPUE (kg/d) and coefficient of variation (CV) for harvest logs and sales slips by statistical area. The square-root transform is applied to harvest log CPUE and the logarithmic transform is applied to sales slip CPUE, prior to calculation of the means. The arithmetic values are given in the third column.

Stat Area	kg/h Harvest logs				kg/d Harvest logs			Sales slips			
	Mean	Std	N	Back-trans mean	Mean	C.V.	Back-trans mean	Mean	C.V.	N	Back-trans mean
2	1.14	0.68	35	1.3	3.76	0.61	14.1	-	-		-
3	2.37	-	1	5.6	5.29	-	28.0	-	-		-
4	2.38	1.14	40	5.7	6.72	0.38	45.2	4.17	0.25	21	64.7
5	2.25	0.63	25	5.1	5.60	0.26	31.3	3.31	0.31	10	27.3
6	1.19	0.34	36	1.4	3.24	0.32	10.5	3.93	0.34	12	50.8
7	2.00	0.51	17	4.0	4.38	0.31	19.1	3.34	0.26	23	28.2
8	3.05	0.77	27	9.3	7.88	0.35	62.0	4.80	0.23	6	122.0
9	1.74	0.42	9	3.0	5.03	0.13	25.3	3.74	0.61	2	42.1
10	2.00	0.08	2	4.0	4.24	0.04	18.0	3.01	0.27	5	20.4
11	1.95	0.99	47	3.8	5.36	0.45	28.7	3.63	0.28	16	37.8
12	2.68	0.73	692	7.2	7.23	0.30	52.3	4.02	0.19	200	55.8
13	2.83	0.75	2102	8.0	6.72	0.28	45.1	3.59	0.15	506	36.2
14	3.44	0.59	4	11.8	7.90	0.34	62.4	3.64	0.27	18	38.2
15	2.71	0.76	11	7.3	7.48	0.31	56.0	3.03	0.54	48	20.6
16	1.90	0.96	83	3.6	4.14	0.48	17.2	4.06	0.30	29	58.1
17	2.44	0.67	255	5.7	6.08	0.29	37.0	4.24	0.18	78	69.5
18	2.89	0.66	407	8.4	7.47	0.25	55.8	4.08	0.15	130	59.1
19	2.67	0.60	176	7.1	6.79	0.22	46.1	4.27	0.29	59	71.4
21	4.06	0.96	5	16.5	11.48	0.24	131.8	4.10	0.21	14	60.2
23	3.15	2.03	25	9.9	7.94	0.61	63.1	4.69	0.30	56	109.3
24	1.65	1.05	29	2.7	4.40	0.54	19.3	3.76	0.44	200	42.8
25	1.51	0.84	16	2.3	4.40	0.59	19.3	2.83	0.42	21	17.0
26	0.73	0.27	50	0.5	1.97	0.33	3.9	2.16	0.80	18	8.7
27	1.27	0.63	26	1.6	3.22	0.45	10.4	3.21	0.45	69	24.7

[a]Yelloweye rockfish catch is not included.
[b]Harvest logs are qualified by a 20-kg minimum catch. Sales slips are qualified by a 50-kg minimum catch.

Fig. 1a. Minor statistical areas along the British Columbia south coast.

Fig. 1a. **STATISTICAL AREA MAP**

SHOWING AREAS OF CATCH FOR
BRITISH COLUMBIA WATERS
SOUTHERN HALF

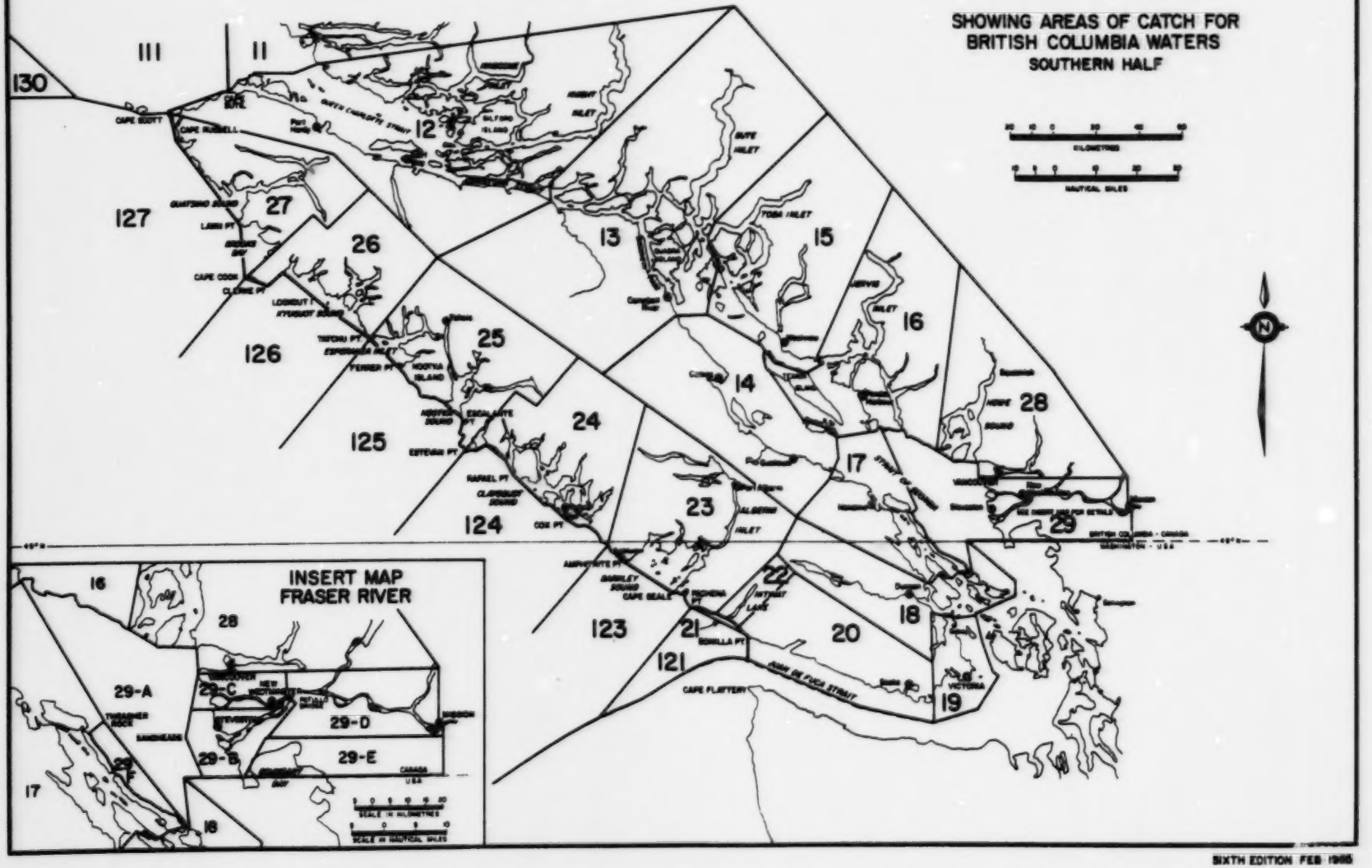

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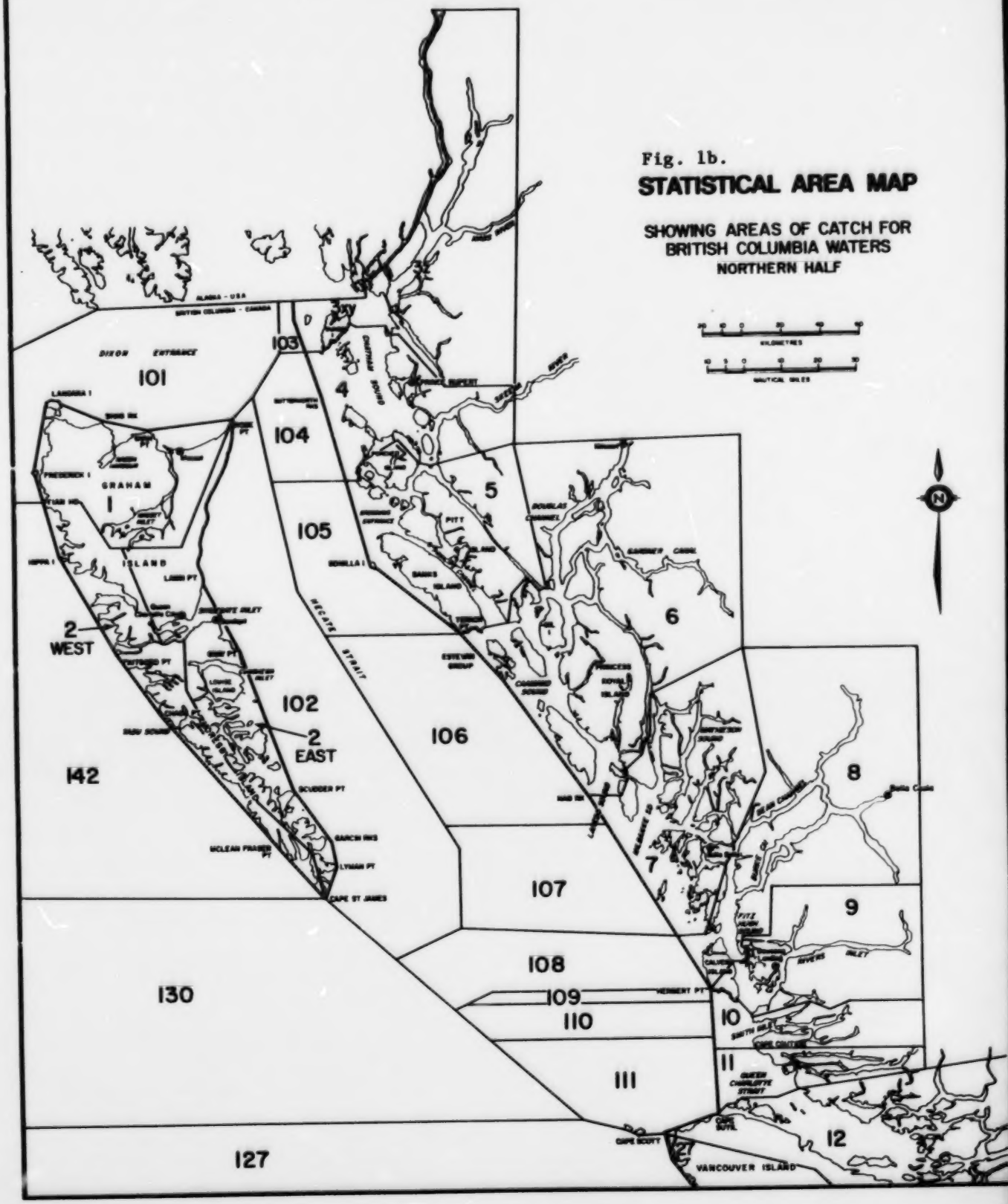
Fig. 1b. Minor statistical areas along the British Columbia north coast.

Fig. 1b.

STATISTICAL AREA MAP

SHOWING AREAS OF CATCH FOR
BRITISH COLUMBIA WATERS
NORTHERN HALF



SKIPPER _____ FISHING METHOD _____

VESSEL _____ CFV _____

CONFIDENTIAL

DATE (DAY-MO-YR)	STAT. AREA	LOCATION (NEAREST CHARTED LANDPOINT)	DEPTH (fm)	TIME SPENT FISHING * (HOURS)	KEPT CATCH (NUMBER OF FISH) QUILL-BACK	COPPER	YELLOW-EYE	LING-COD	OTHER (SPECIFY)	REMARKS

* ACTUAL TIME WITH FISHING GEAR IN THE WATER

MAIL TO: GROUNDFISH, PACIFIC BIOLOGICAL STATION, NANAIMO, B.C. V9R 5K6

Fig. 2. Nearshore rockfish harvest log format.

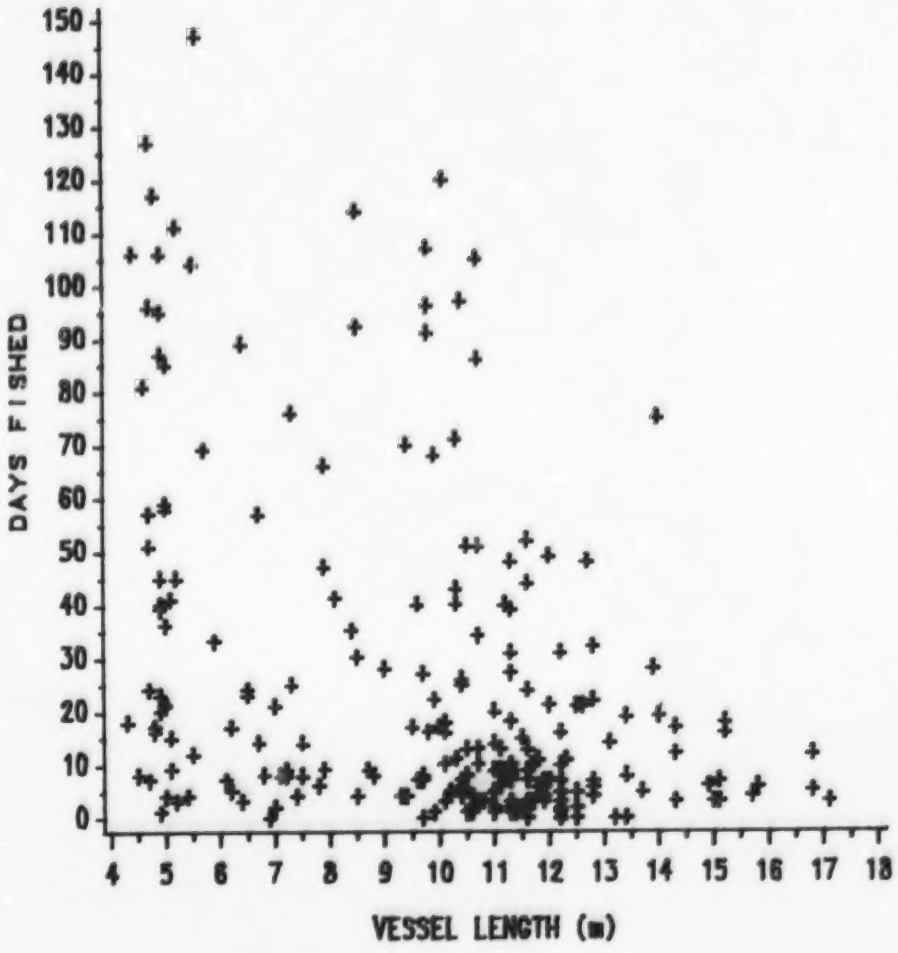
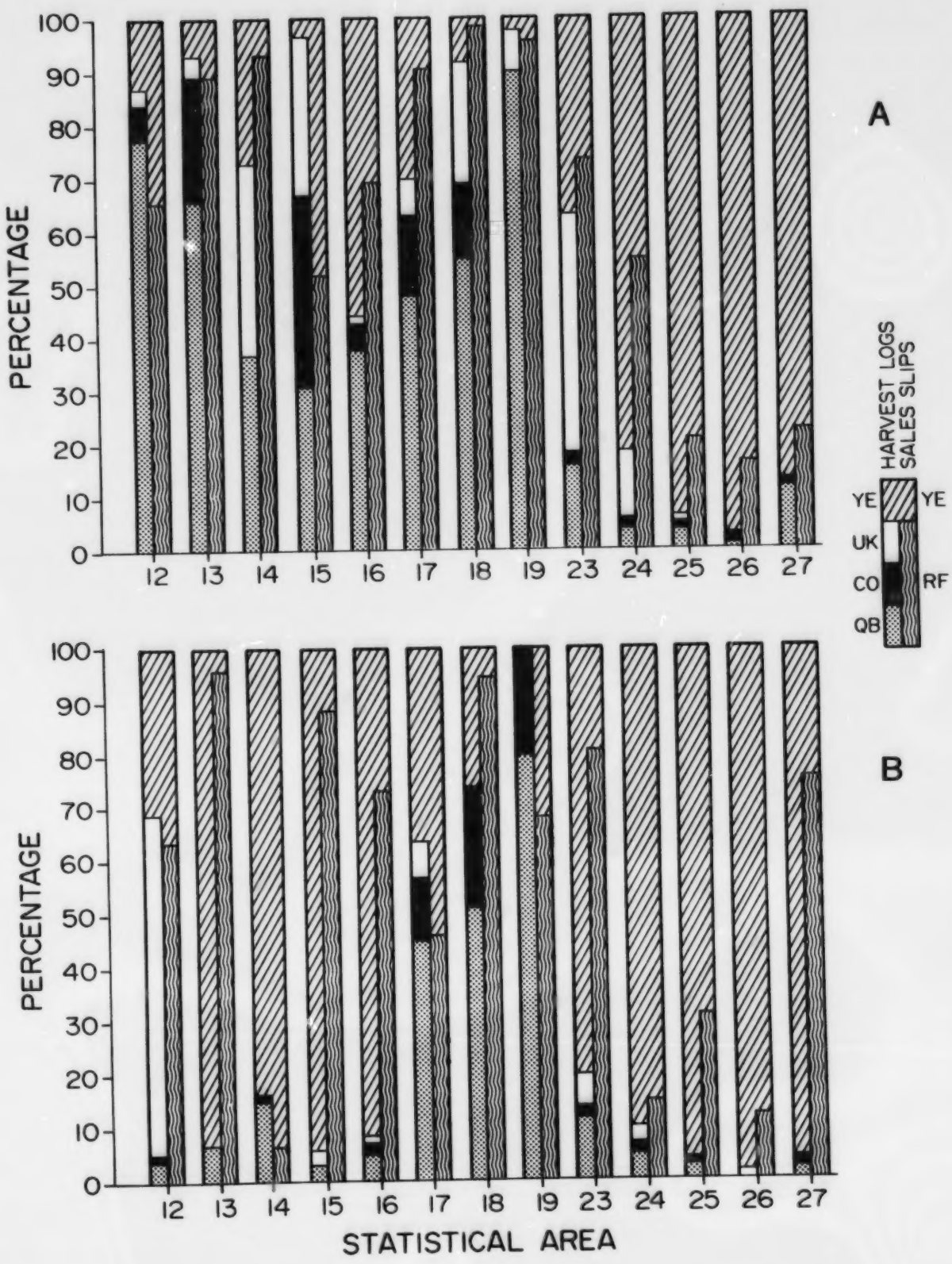


Fig. 3. Relationship between total days fished and vessel length (m) for handline vessels, from harvest log data.

Fig. 4. Species composition (percent by weight) of the (A) handline catch and (B) longline catch from harvest logs and sales slips, 1986.


PERCENTAGE
100
90
80
70
60
50
40
30
20
10
0
12
13
14
15
16
17
18
19
23
24
25
26
27
A
HARVEST LOGS
SALES SLIPS
YE
YE
UK
CO
RF
QB
B
PERCENTAGE
STATISTICAL AREA

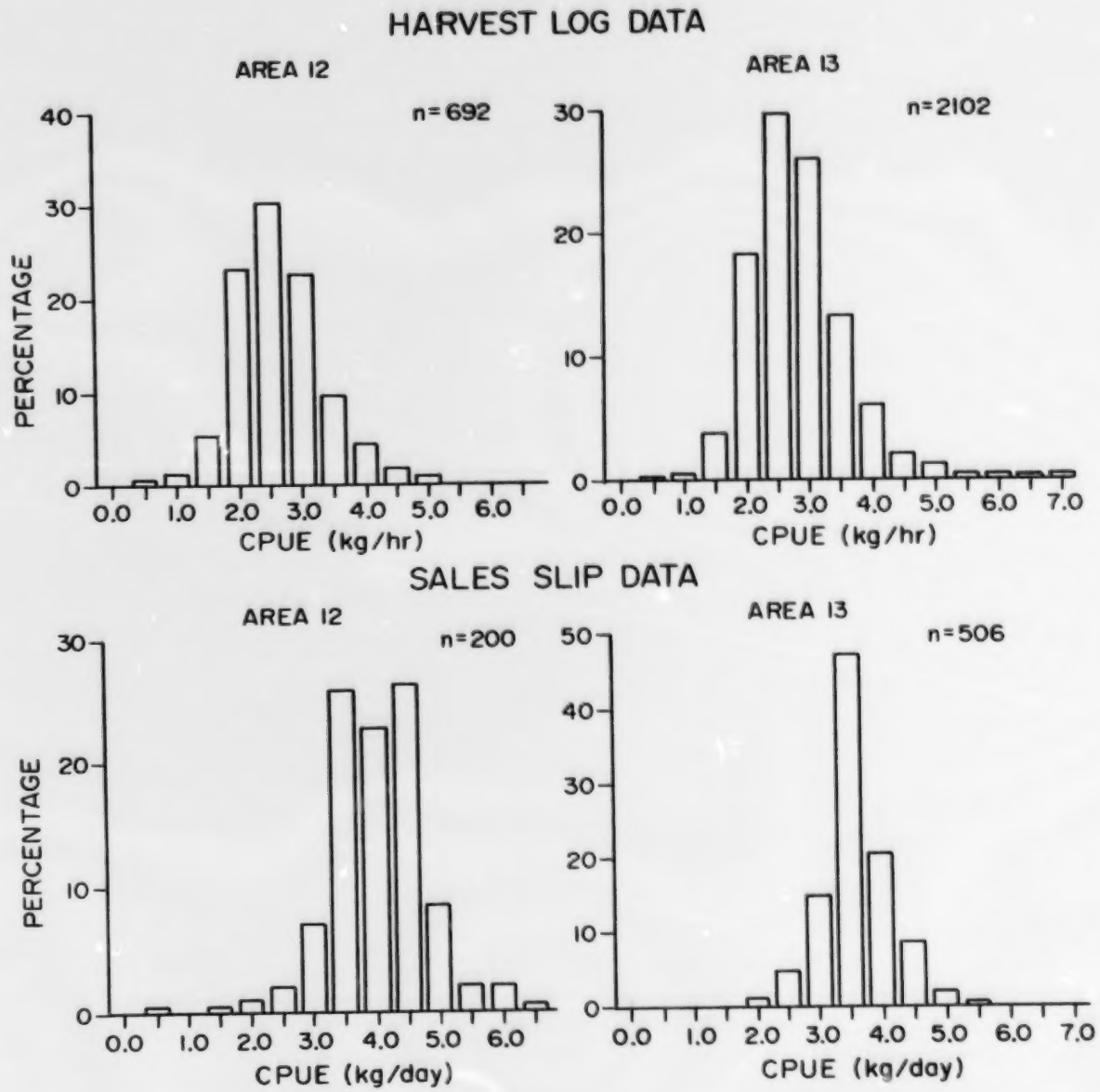


Fig. 5. Frequency distributions of square-root transformed CPUE from harvest logs and log transformed CPUE from sales slips for statistical areas 12 and 13.